

### **REMARKS**

Claims 1-6 and 8-20 are currently present in this case. Claims 1, 3, 6 and 9 are currently amended. Claims 1 and 6 now include the limitations of originally filed claim 7, now canceled. Support for the amendments to claims 3 and 9 can be found in figures 3-5 and/or the supporting text for these figures in the written description. Claims 2, 4, 8, 10 and 16 are original and claims 5, 11, 13-15 and 17-20 are withdrawn. Claims 6, 7, 9, 10 and 12 are all rejected as anticipated under 35 U.S.C. 102(b) by DE 484,761 to Rohde. Claim 8 stands rejected as unpatentable under 35 U.S.C. 103(a) by DE 484,761 to Rohde. Claims 1-4, 12 and 16 stand rejected as unpatentable under 35 U.S.C. 103(a) by US 5,770,035 to Faita in view of DE 484,761 to Rohde. Applicants traverse these rejections and respectfully request reconsideration of the application as in light of the above amendments and the arguments below. Applicants believe that in light of the current state of the record the pending application is in condition for allowance, and respectfully request timely issuance.

### **Present Invention**

The present invention relates to an electrochemical cell suitable for a membrane electrolysis process using an anode compartment having a metal electrode, a cathode compartment having a gas diffusion electrode and an ion exchange membrane arranged between the anode compartment and the cathode compartment. The metal electrode functions as an anode and is capable of being dipped into electrolyte during use and is provided with one or more orifices for the passage of gas formed during operation. The metal electrode is angled and/or curved, and the orifices preferably have guide structures that conduct the gas formed to a side of

the metal electrode that faces away from the cathode. The present invention also relates to methods for use of electrodes and electrochemical cells. The present invention also provides for an electrochemical cell for a membrane electrolysis process, which cell has, as the anode, a metal electrode preferably having as large an electrochemically active surface, and orifices making it possible to conduct gas formed from the side facing the cathode into a space located behind the metal electrode. The electrochemical cell is suitable for use in the electrolysis of an aqueous solution of hydrogen chloride. The cathode used typically being a gas diffusion electrode. The anode compartment is filled with the hydrochloric acid, the latter flowing through the anode compartment from bottom to top.

**Rejections under 35 U.S.C. § 102**

Applicants respectfully traverse all the 35 U.S.C. 102(b) anticipation rejections set forth in the Official Action.

Generally, the Examiner must make a *prima facie* case of un-patentability. The burden of making a *prima facie* case of anticipation rests with the Examiner and the United States Patent and Trademark office. *In re Skinner*, 2 USPQ 2d 1788, 1789 (Bd. Pat. App. & Int’f 1986). “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegall Bros. v. Union Oil Co. of California*, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987). Accordingly, any unreasonable assertion of anticipation would not shift the burden and Applicant need only point to the unreasonableness of the Examiner’s assertion of anticipation.

Applicants respectfully traverse the rejection of claims 6, 7, 9, 10 and 12 as anticipated under 35 U.S.C. 102(b) by DE 484,761 to Rohde.

The rejection of record with regard to claims 6, 7, 9, 10 and 12 does not make out a *prima facie* case of anticipation because the reference does not disclose all the elements of the claimed invention. Specifically, Rohde does not disclose the metal electrode as angled and/or curved. Rohde is silent about the overall geometry of its disclosed electrode. Rohde is an improvement patent that discloses a known electrode that is modified to achieve the object of reduced current resistance and removal of released gasses. Rohde is silent in regards to the overall geometry of its metal electrode. Instead Rohde focuses on the design of the pockets and cavities formed by punching out flat sheet metal and attaching sidewalls to meet the objects of the improvement invention. (See page 3 line 12 to page 4 line 10 of the USPTO provided English Language Translation of Rohde). Therefore, from this teaching and the related figures it is reasonable to conclude that the electrode of Rohde is flat. In contrast to this electrode design Applicant claims a metal electron that is angled and/or curved. The Examiner rejected this limitation in previous claim 7 as anticipated by noted that the ducts of the Rohde electrode are angled. However, the claimed angled/or curved limitation is drawn to the geometry of the metal electrode and not the geometry of the ducts of the electrode. Therefore, Rohde does not disclose all the claimed elements of the present invention. Accordingly, Rohde cannot anticipate the invention of claim 6. Applicant requests that the rejection be withdrawn and the claim allowed to issue.

In regards to claims 9, 10 and 12 they all depend and/or include the subject matter of claim 6. Therefore, they are patently distinct over the prior art of record as noted above in

regards to claim 6. Accordingly, Rohde cannot anticipate the invention of claims 9, 10 and 12.

Applicant requests that the rejection be withdrawn and the claims allowed to issue.

Furthermore, in regards to claim 9, a metal electrode is claimed as having a waveform cross section. Rohde does not disclose such a cross sectional design of its metal electrode. Figure 2 of Rohde discloses a symmetrical two electrode laminate cross section design. Therefore for this additional reason of an absence of a clear teaching of a waveform cross section of a metal electrode Rohde cannot anticipate the invention of claim 9. Accordingly for this additional reason Applicant requests that the rejection be withdrawn and the application allowed to issue.

In regards to claim 7, the claim has been cancelled, hence the rejection is moot.

### **Rejections under 35 U.S.C. § 103**

Applicants respectfully traverse all the 35 U.S.C. 103(a) obviousness rejections set forth in the Official Action.

The test for obviousness of a claimed invention relative to the prior art is whether the subject matter claimed as a whole would have been obvious at the time the invention was made to a person of ordinary skill in the relevant art. 35 U.S.C. § 103(a) As a matter of law four factual inquiries must be made regarding: 1) the scope and content of the prior art; 2) the level of ordinary skill in the art; 3) the differences between the claimed invention and the prior art; and 4) secondary considerations such as commercial success, long felt but unresolved need, failure of others, copying and unexpected results. *Graham v. John Deere Co.*, 148 USPQ 459, 466-7 (1966).

During patent examination the Examiner bears the burden of presenting a *prima facie* case of obviousness. *In re Glaug*, 62 USPQ 2d 1151, 1152-3 (Fed. Cir. 2002). If the Examiner fails to meet this burden, applicant is entitled to the patent. *Id.* Only when a *prima facie* case is made does the burden shift, requiring Applicant to come forward and rebut the showing of obviousness with patentability evidence and/or arguments. *Id.* Patentability is then determined on the record as a whole, by a preponderance of the evidence and weight of arguments. *Id.*

Anticipation requires a reference to disclose every element of the claim. If any differences exist between the reference and the claim, the rejection must be based on obviousness. *Titanium Metals Corp. v. Banner*, 227 USPQ 773, 777 (Fed. Cir. 1985). A *prima facie* case of obviousness still requires that all claim limitations be taught or suggested by the prior art. Manual Patent Examination Procedure, 2143.03 (8<sup>th</sup> Ed., Rev. 3, Aug. 2005) (citing multiple cases) In establishing a *prima facie* case of obviousness, the Examiner must show "some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine [or otherwise modify] the relevant teachings of the references." *In re Fine*, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Namely, there must be particular findings related to the obviousness determination. *In re Kotzab*, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). Broad conclusory statements standing alone are insufficient. *Id.* The factual question of motivation is material to patentability, and cannot be resolved on subjective belief and unknown authority. *In re Lee*, 61 USPQ2d 1430, 1433-34 (Fed. Cir. 2002). Commonly, a new invention consists of a combination of old elements. *In re Kotzab*, 55 USPQ at 1316-7. Thus, every element of a claimed invention often are found in the prior art. *Id.* However, merely pointing out each claim element in the prior art is insufficient to defeat

patentability of the claimed invention. *Id.* A *prima facie* case of obviousness can either be disproved or rebutted. Showing that the art in any *material* respect teaches away from the claimed invention disproves the existence of a *prima facie* case. *Winner Int'l Royalty Corp. v. Wang*, 53 USPQ2d 1580, 1587-8 (Fed. Cir. 2000), *cert. denied*, 530 U.S. 1238 (2000). Furthermore, a *prima facie* case may be rebutted through a showing of secondary considerations. *Id.* See also *In re Woodruff*, 16 USPQ 2d 1934, 1936-7 (Fed. Cir. 1990).

Applicant respectfully traverse the rejection of claim 8 as obvious under 35 U.S.C. 103(a) by DE 484,761 to Rohde.

The rejection of record with regard to claim 8 does not make out a *prima facie* case of obviousness because the reference does not disclose all the elements of the claimed invention. Claim 8 depends from claim 6. Claim 6 positively claims a metal electrode that is angled and/or curved. Rohde is silent about the overall geometry of its disclosed electrode. Therefore Rohde does not have all the elements of the claim invention and cannot render obvious the invention of claim 8. Accordingly, Applicant requests that the rejection be withdrawn and the claims allowed to issue.

Furthermore, Rohde is silent in regards to its cross-sectional area of the orifices. The relevant limitations of claim 8 that must be address in the reject are as follows:

“the total cross-sectional area of all orifices provided in said electrode is in the range from 20% to 70% of the area which is formed by the height and width of the metal electrode.”

The rejection does not address these limitations. Instead the rejection asserts that Rohde can be modified by one of ordinary skill in the art to conclude that it teaches “optimum orifice area to maximize electrode contact area relative to gas ducting”. A proper obviousness analysis requires a finding of a motivation to modify the teachings as viewed by one of ordinary skill in the art to render the claimed invention obvious. The rejection has not addressed the limitation of claim 8, nor has it provided a motivation to modify the reference of Rohde to draw the asserted modification of “optimum orifice area to maximize electrode contact area relative to gas ducting”. This is not proper obviousness analysis under 35 U.S.C. 103(a) and *Graham v. John Deere*. Therefore, the Examiner has not established a *prima facie* case of obviousness to properly shift the burden to Applicant in regards to the unpatentability of claim 8 as obvious over the prior art. Accordingly, for these additional reasons Applicant’s request that the rejection of claim 8 be withdrawn and the claim allowed to issue.

Applicant respectfully traverse the rejection of claims 1-4, 12 and 16 as unpatentable under 35 U.S.C. 103(a) by US 5,770,035 to Faita in view of DE 484,761 to Rohde.

Faita discloses an improved method for the production of chlorine from aqueous hydrochloric acid in a membrane electrolysis cell. Faita uses a cathode compartment equipped with a gas diffusion cathode fed with air or enriched air or oxygen and an anodic compartment with an anode provided with an electro-catalytic coating for chlorine evolution. Rodhe was summarized above in response to the anticipation rejections. The Examiner admits on the record that Faita does not disclose all the elements of the claimed invention. Rohde does not fill the gap in disclosure of Faita. Neither reference discloses a metal electrode that is angled and/or curved.

This metal electrode geometry has the benefit of maximizing the electrochemically active surface area of the electrode. (See page 4 paragraph 20 lines 20-27) Hence the instant rejections of claim 1 cannot make out a *prima facie* case of obviousness because the cited references do not disclose all the claimed elements. Accordingly, Applicants respectfully request that these rejections be withdrawn.

In regards to claims 2-4, 12 and 16 they all depend and/or include the subject matter of claim 1. Therefore, they are patently distinct over the prior art of record as noted above in regards to claim 1. Accordingly, the combination of Faita and Rohde cannot render obvious the invention of claims 2-4, 12 and 16. Applicant requests that the rejection be withdrawn and the claims allowed to issue.

Furthermore, in regards to claim 3 a metal electrode is claimed as having a waveform cross section. Neither Faita nor Rohde disclose such a cross sectional design of any metal electrode. Figure 2 of Rohde discloses a symmetrical two electrode laminate cross section design. Therefore for this additional reason of an absence of a clear teaching of a waveform cross section of a metal electrode the combination cannot render obvious the invention of claim 3. Accordingly for this additional reason Applicant requests that the rejection be withdrawn and the application allowed to issue.

### CONCLUSION

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration of the application and timely allowance of pending claims 1-6 and 8-20.



In the event the Examiner believes that an interview would be helpful in resolving any outstanding issues in the case, the undersigned attorney is available to discuss the issues.

Enclosed is authorization to pay for a three month extension of time. Applicant believes no additional fees are due with this response. However, if a fee is due, please charge our Deposit Account No. 03-2775, under Order No. 22133-00005-US from which the undersigned is authorized to draw.

Dated:

3 Aug 06

Respectfully submitted,

By

  
William E. McShane

Registration No.: 32,707

Joseph Weiss

Registration No.: 56,843

CONNOLLY BOVE LODGE & HUTZ LLP

1007 North Orange Street

P.O. Box 2207

Wilmington, Delaware 19899

(302) 658-9141

(302) 658-5614 (Fax)

Attorneys for Applicant